

**REMARKS**

The present application was filed on July 10, 2003 with claims 1 through 21. Claims 2, 6, 10-13, 16 and 18 have been previously canceled without prejudice. Claims 10-13 had been withdrawn from consideration in response to a restriction requirement. Therefore, claims 1, 3-5, 7-9, 14, 15, 17 and 19-21 are presently pending in the above-identified patent application. Applicant herein proposes to amend claims 1, 14 and 21. Support for the amendments can be found, for example, page 11, line 5 through page 12, line 20, page 8, lines 7-25, and FIG. 4. No new matter is being introduced.

In the Office Action, the Examiner rejected claims 1, 3-5, and 7-9 are rejected under 35 U.S.C. §101 because the claimed invention is allegedly directed to non-statutory subject matter, rejected claims 1, 3-5, 7-9, 14-15, 17 and 19-21 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, and rejected claims 1, 3-5, 7-9, 14-15, 17, and 19-21 under 35 U.S.C. §103(a) as allegedly being unpatentable over Eisenberg et al. (Nature, volume 299, 1982, pages 371-274) (hereinafter "Eisenberg") in view of Silverman (PNA; April 24, 2001; volume 98, pages 4996-5001) (hereinafter "Silverman").

This amendment is submitted pursuant to 37 CFR §1.116 and should be entered. The Amendment places all of the pending claims, i.e., claims 1, 3-5, 7-9, 14, 15, 17 and 19-21, in a form that is believed allowable, and, in any event, in a better form for appeal. It is believed that examination of the pending claims as amended, which are consistent with the previous record herein, will not place any substantial burden on the Examiner, and Applicants submit that the amendment does not include matter extraneous to the previous record.

The comments of the Examiner in forming the rejections are acknowledged and have been carefully considered.

Section 101 Rejection

In the Office Action, the Examiner rejected claims 1, 3-5, and 7-9 under 35 U.S.C. §101 as allegedly being directed to non-statutory subject matter. Specifically, on  
5 page 4, the Office Action stated that

the method claims are not so tied to another statutory class of invention because the method steps that are critical to the invention are “not tied to any particular apparatus or machine” and therefore do not meet the machine-or-transformation test as set forth in *In re Bilski* 545 F.3d 943, 88 USPQ2d 1385  
10 (Federal Circuit, 2008).

Applicant, as proposed herein, has amended independent claim 1 to include a tertiary protein structure analyzer embodied on a tangible computer-readable recordable storage medium executing on a computer configured to perform the denoted steps.  
15 Support for the amendments can be found, for example, page 11, line 5 through page 12, line 20 and FIG. 4.

As stated by the United States Court of Appeals for the Federal Circuit (*In re Bilski* (2008)), “A claimed process is surely patent-eligible under § 101 if: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different  
20 state or thing.” As such, Applicant respectfully asserts that, as amended, independent claim 1 recites a tie to a particular machine or apparatus, namely, a tertiary protein structure analyzer embodied on a tangible computer-readable recordable storage medium executing on a computer configured to perform the denoted steps.

Additionally, Applicant respectfully submits that the ties to the device that  
25 executes on a hardware processor, as well as the tie to an apparatus such as a computer, overcome the rejection and provide patentable subject matter. In *Ex parte Bo Li*, Appeal 2008-1213 (BPAI 2008), the BPAI stated that

the instant claim presents a number of software components, such as the claimed logic processing module, configuration file processing module, data  
30 organization module, and data display organization module, that are embodied upon a computer readable medium. This combination has been found statutory under the teachings of *In re Lowry*, 32 F.3d 1579 (Fed. Cir., 1994).

Therefore, Applicant respectfully asserts that independent claim 1, as amended,  
35 overcomes the §101 rejection. Also, Applicant further submits that by virtue of their

dependence on allowable independent claim 1, claims 3-5 and 7-9, respectively, are directed to statutory subject matter in their own right.

Thus, Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1, 3-5, and 7-9 under 35 U.S.C. §101.

5

Section 112, Second Paragraph, Rejection

Also, the Examiner rejected claims 1, 3-5, 7-9, 14-15, 17 and 19-21 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10 Beginning on page 5, the Office Action stated that

15 [t]he term “same fractional distance” as newly amended claims 1, 14, and 21 is a relative term which renders the claim indefinite. The term “same fractional distance” is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is not known relative to what quantity each residue centroid has the same fractional distance.

20 Applicant, as proposed herein, has amended independent claims 1, 14 and 21 to include “wherein each residue centroid having a same fractional distance to a surface of the tertiary protein structure as one or more additional residue centroids contributes an equivalent magnitude to the global linear hydrophobic moment as the one or more additional residue centroids by mapping each residue at a same distance from a center of the protein structure.” Support for the amendment can be found, for example, on page 8,  
25 lines 7-25.

Applicant submits that, as amended, claims 1, 14 and 21, and the claims dependent therefrom, are definite and distinctly claim the subject matter which Applicant regards as the invention. Thus, Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1, 3-5, 7-9, 14-15, 17 and 19-21 under 35 U.S.C.  
30 §112, second paragraph.

Section 103(a) Rejection

The Examiner also rejected claims 1, 3-5, 7-9, 14, 15, 17 and 19-21 under 35 U.S.C. §103(a) as allegedly being unpatentable over Eisenberg in view of Silverman.

With regard to the §103 rejections, Applicant initially notes that a proper *prima facie* case of obviousness requires that the cited references when combined must “teach or suggest all the claim limitations,” and that there be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references or to modify the reference teachings. See MPEP §706.02(j). Therefore, as an initial matter, Applicant respectfully submits (as detailed below) that the cited combination of references does not teach or suggest all of the limitations of the claims.

Beginning on page 8, the Office Action stated that

[t]he article of Eisenberg et al. studies use of a first order helical hydrophobic moment to measure the amphiphilicity of a helix.

The abstract on page 371 of Eisenberg et al. quantifies the mean hydrophobic moment as a vector sum of all of the first order hydrophobic moments of the residues constituting the helix.

Applicant respectfully disagrees with the above assessment and submits that Eisenberg does not use a calculation of the first order moment. The abstract on page 371 of Eisenberg states that

we define the mean helical hydrophobic moment... to be the mean vector sum of the hydrophobicities... of the side chains of a helix of N residues.

Applicant asserts that this does not teach or disclose using a first order moment calculation to define a global linear hydrophobic moment, as is claimed in independent claims 1, 14 and 21. Further, claims 1, 14 and 21 all explicitly include the aspect of “using the first-order hydrophobic moment and the enhanced correlation between residue centroid magnitude and residue solvent accessibility to define the global linear hydrophobic moment.” And, as was previously established, for example, on page 8 of the Office Action dated August 5, 2008, the Examiner has conceded that

Eisenberg et al. does not show correlation enhancement between residue centroid magnitude and solvent accessibility....

Consequently, Applicant respectfully asserts that because Eisenberg does not show using the first-order hydrophobic moment nor using an enhanced correlation between residue centroid magnitude and solvent accessibility to define the global linear

hydrophobic moment, an argument based in the teachings of Eisenberg to teach the same limitation cannot be accepted as grounds for unpatentability.

Additionally, page 9 of the Office Action further concedes that

5 Eisenberg et al. does not use residue centroids as the origins in the hydrophobic moment calculations....

Applicant notes that this further emphasizes the point that Eisenberg does not define a global linear hydrophobic moment as taught in independent claims 1, 14 and 21 because those claims (unlike Eisenberg) explicitly use “the centroid of residue centroids  
10 as a spatial origin of a global linear hydrophobic moment.”

Additionally, page 11 of the Office Action stated that Eisenberg teaches the limitation of enhancing correlation between residue centroid magnitude and residue solvent accessibility, wherein the correlation between residue centroid magnitude and residue solvent is enhanced using a distance metric. Applicant re-emphasizes that on  
15 page 8 of the Office Action dated August 5, 2008, the Examiner conceded that

Eisenberg et al. does not show correlation enhancement between residue centroid magnitude and solvent accessibility....

Further, the Examiner, continuing on page 11 of the current Office Action, noted  
20 that

Figure 2 of Eisenberg et al. also demonstrates an enhanced correlation between residue centroid magnitude and residue solvent accessibility, wherein the correlation between residue centroid magnitude and residue solvent accessibility is enhanced using a distance metric.  
25 Specifically, the ordinate axis of Figure 2 of Eisenberg et al. demonstrates a residue centroid magnitude which is then correlated to solvent accessibility (i.e. “Globular,” “Surface,” and “Membrane”) within the plot of Figure 2 of Eisenberg et al.

Applicant respectfully disagrees with the above assessment, first because it has already been established that Eisenberg does not use residue centroids as the origins in the hydrophobic moment calculations, of which this is one, and second because column 2 of page 372 of Eisenberg states that

35 [t]he abscissa value of Fig. 2 reflects the solubility of each helix in a non-polar medium.... The ordinate reflects the tendency of a helix to assume a preferred orientation at an interface between polar and non-polar media.

As such, Applicant submits that Eisenberg, the ordinate axis of Figure 2 and otherwise, does not demonstrate the claimed aspect of an enhanced correlation between residue centroid magnitude and residue solvent accessibility. Consequently, Applicant re-asserts that the combination of references does not teach or suggest this aspect of independent claims 1, 14 and 21.

Also, Applicant assert that the cited references do not teach or suggest the claimed aspect of wherein each residue centroid having a same fractional distance to a surface of the tertiary protein structure as one or more additional residue centroids contributes an equivalent magnitude to the global linear hydrophobic moment as the one or more additional residue centroids by mapping each residue at a same distance from a center of the protein structure, as included in amended claims 1, 14 and 21.

Page 8 of the Office Action stated that

[s]ince all of the centroid magnitudes in Figure 1 have a different fractional distance the newly amended mapping step does not apply.

Also, page 12 of the Office Action stated that

[a]s no one of the residue centroids of Eisenberg has the same exact fractional distance as a second residue centroid, this limitation is met in Eisenberg et al. i.e. because no two residues have the exact same fractional distance, there is no mapping to be carried out.

Applicant respectfully submits that Eisenberg does not teach using or calculating fractional distance, from a residue centroid (which, as has been established, Eisenberg does not use for hydrophobic moment calculations, of which this is another) or otherwise. For example, as described in column one of page 372, in Figure 1 of Eisenberg, "The length of each vector is  $H_i$ , the hydrophobicity of the residue." However, no mention is made to fractional distance measurements or calculations, and as such Applicant asserts that the noted aspect of claims 1, 14 and 21 are applicable and correspondingly not taught by the references.

Further, with respect to amended independent claim 1 and the claims dependent therefrom, Applicant submits that the cited references do not teach or suggest the aspect of a tertiary protein structure analyzer embodied on a tangible computer-readable

recordable storage medium executing on a hardware processor to perform the denoted steps.

As noted herein, Applicant respectfully asserts that independent claims 1, 14 and 21 overcome the rejection as allegedly unpatentable over the references cited in this rejection. As a result, Applicant respectfully submits that the combination of references  
5 does not teach or suggest the limitations in question, and therefore, that the §103 rejection is improper. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Also, Applicant further submits that by virtue of their  
10 dependence on independent claims 1 and 14, claims 3-5, 7-9 and 15, 17-20, respectively recite patentable subject matter in their own right. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Therefore, Applicant respectfully requests withdrawal of the §103(a) rejection from claims 1, 3-5, 7-9, 14, 15, 17 and 19-21.

15

All of the pending claims, i.e., claims 1, 3-5, 7-9, 14, 15, 17 and 19-21, are in condition for allowance and such favorable action is earnestly solicited.

If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this application, the Examiner is invited to contact the  
20 undersigned at the telephone number indicated below.

The Examiner's attention to this matter is appreciated.

Respectfully submitted,

25



Date: June 1, 2009

30

Michael J. Cooper  
Attorney for Applicant(s)  
Reg. No. 57,749  
Ryan, Mason & Lewis, LLP  
1300 Post Road, Suite 205  
Fairfield, CT 06824  
(203) 255-6560